

Application of Endoscopic Specialty Internet Platform to Continuing Medical Education for Clinical Endoscopes During COVID-19 Epidemic

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Abstract

Background

To explore the use of digestive endoscopy professional Internet platform by domestic endoscopists and its application effect on endoscopists' continuing medical education, analyze the related problems of continuing medical education under this mode, and put forward targeted improvement suggestions.

Methods

Based on the doctor circle app platform, a questionnaire was sent to all members who successfully registered on the Internet platform of Hebei biliary and pancreatic endoscopy diagnosis and treatment alliance. The questionnaire lasted 30 days from the beginning to the end. The questionnaire survey results were collected and counted for grouping comparison.

Results

By the deadline, 703 completed questionnaires had been received. After the registered doctors joined the platform, 469 (66.7%) had a significant impact on their own endoscopic operation level, and 354 (50.3%) felt a significant improvement in the diagnosis level of biliary and pancreatic related diseases. The application effect of the platform on students' continuing medical education was affirmed by the vast majority of registered doctors; The clinical specialty of registered doctors, the length of time they joined the platform, the time they participated in the platform activities each time, and whether they watched the course playback after the platform live broadcast course were the main factors affecting the application effect of continuing medical education ($P < 0.05$). The time they joined the platform was 6–12 months, and the time they participated in the platform activities each time lasted 1–2 hours, and registered doctors who often watch course playback benefit significantly.

Conclusion

The new model of continuing medical education based on the Internet platform breaks through the constraints of the traditional model and meets the individualized needs of every medical worker to improve their comprehensive level; At present, the outbreak of global COVID-19 makes this learning mode more and more popular among medical workers. We should constantly improve the arrangement of the contents and forms of continuing medical education courses, make the Internet platform better serve the majority of medical workers, and effectively improve the comprehensive quality level of clinicians.

Background

"Internet plus" is a new form of Internet products. With the rapid development of Internet and information technology, the new ecological mode of "Internet plus" has brought about a new development in the medical field. A large number of reports have shown that "Internet plus" is conducive to the development and sharing of medical resources[1, 2], and plays a vital role in improving the professional ability and comprehensive quality of health professionals.

Continuing Medical Education (CME) is an on-the-job education after completing medical school education and post graduation education (Graduate Education and resident standardized training). Continuing medical education, as the main form for medical staff to obtain medical cutting-edge knowledge, theory and technology, plays an important role in promoting the integration of medical science and technology theory and clinical practice. Vigorously developing the content and form of continuing medical education is not only in line with the requirements of health development and promote the progress of medical science and technology, but also the urgent need for every medical worker to improve their comprehensive level. In today's society, the popularity of smart phones also creates a new opportunity for medical staff to combine mobile medical information update with clinical practice[3, 4]. In addition, with the development of the global COVID-19 epidemic, various fields have been greatly affected, and the field of scientific research is also unable to escape the impact of the epidemic. Domestic and foreign university meetings have been forced to cancel the [5, 6]. Therefore, the learning mode with the help of Internet platform has also become the primary choice for the majority of medical workers.

Digestive endoscopy has become an important technical means for the diagnosis and treatment of digestive system diseases, including gastroscopy, duodenoscopy, endoscopic ultrasonography, colonoscopy, etc., and derived advanced diagnosis and treatment technologies such as ERCP (Endoscopic Retrograde Cholangiopancreatography), EUS (Endoscopic Ultrasonography), ESD (Endoscopic Submucosal Dissection), POEM (Peroral Endoscopic Myotomy). In recent years, with the rapid development of Internet technology, the Internet platform of digestive endoscopy has undergone unprecedented changes. A large number of widely used Internet platforms have sprung up. So far, there is no research on endoscopists' use of digestive endoscopy professional Internet platform and the impact of digestive endoscopy professional Internet platform on endoscopists' Continuing Education at home and abroad. This study will fill the gap in this research direction.

Methods

1. Research Object

Successfully registered as a clinician on the Internet platform of Hebei Alliance for biliary and pancreatic endoscopy diagnosis and treatment.

2. Research Methods

Based on the app platform of doctor circle, a questionnaire was sent to all members (3938 at the time of issuing the questionnaire) who were successfully registered on the Internet platform of Hebei Alliance for

biliary and pancreatic endoscopy diagnosis and treatment, and the questionnaire survey results were collected. After consulting relevant literature and consulting experts in relevant fields, combined with the research purpose of this subject, the relevant questionnaire is the "questionnaire on the participation of registered doctors of Hebei biliary and pancreatic endoscopy diagnosis and treatment alliance" designed and prepared by the questionnaire star.

The contents of the questionnaire include: 1) the basic information of the respondents: including gender, age, current highest educational background, hospital level, specialty and professional title engaged in clinical work, etc. 2) The learning situation of the respondents who log in to this platform: including login frequency, joining time, time of participating in platform activities each time, watching course playback, etc. 3) the application effect of the platform on the continuing medical education of registered doctors: including the impact on their own endoscopic operation level and the diagnosis and treatment of related biliary and pancreatic diseases. 4) the evaluation of the platform. 5) the respondents believe that the platform has shortcomings and suggestions for improvement. This questionnaire can be logged in by identifying the "questionnaire star QR code POSTER" or directly clicking the provided network link. Firstly, the questionnaire briefly introduces the purpose and filling method of the survey to the participants. Its content consists of 16 single choice questions, 4 multiple choice questions and 1 voluntary short answer question. The answer method is convenient, and it takes about 1 ~ 2min to complete all the questions. In order to ensure the accuracy and authenticity of the questionnaire results, we started the settings of IP address restriction and wechat response control. At the same time, in order to shorten the survey cycle, the questionnaire lasted 30 days from the beginning to the end.

3. Statistical Methods

The questionnaire data were collected through the questionnaire star background, and the data were statistically analyzed by SPSS 23 statistical software. The counting data were expressed by rate or constituent ratio, and the difference between the two population rates or constituent ratios was inferred Chi square test or Fisher's exact probability method was used, with $P < 0.05$ as the difference, which was statistically significant. The constituent ratios of multiple samples are compared by R×C diagram Chi square test, chi square segmentation method is used for multiple comparisons among multiple sample rates.

Results

1. General Information

Up to the deadline, 703 completed questionnaires have been received. Finally, 703 valid research questionnaires have been determined, with an effective rate of 100%. From the questionnaire data collected, there were 521 male participants (71.1%) and 182 female participants (25.8%); Age distribution: 39 people under the age of 19 (5.5%), 359 people aged 20 ~ 29 (51.0%), 266 people aged 30 ~ 39 (37.8%), 36 people aged 40 ~ 49 (5.1%), and 3 people over 50 (0.4%); Education distribution: 169 college students (24.0%), 439 undergraduate students (62.6%); 95 people (13.5%) with master's degree or above; Hospital

grade distribution: 175 (24.8%) in class III A, 232 (33%) in class III B, 226 (32.1%) in class II A, 51 (7.2%) in class II B and 19 (2.7%) in others; Professional distribution of clinical work: 146 (20.7%) in gastroenterology, 276 (39.2%) in general surgery, 213 (30.3%) in endoscopy center, 51 (7.2%) in nursing and 17 (2.4%) in others; Title Distribution: 108 medical students (15.3%), 180 residents (25.6%), 226 attending doctors (32.1%), 118 deputy chief doctors (16.7%), 42 chief doctors (5.9%), and 29 other titles / identities not listed (4.1%); The distribution of endoscopic operation types (multiple choices): ERCP accounted for 48.6% (342 / 703), EUS 52.9% (372 / 703), gastroscope and colonoscopy 57.0% (401 / 703), ESD 31.2% (220 / 703) and others 5.6% (40 / 703).

2. Statistics on the Cumulative Number of ERCP Cases Completed by Individual Registered Doctors (Fig. 1) and Affiliated Hospitals (Fig. 2)

3. Application Effect of Hebei Biliary and Pancreatic Endoscopy Diagnosis and Treatment Alliance Platform on Continuing Medical Education for Registered Doctors

3.1 Learning of registered doctors on the platform of Hebei Alliance for diagnosis and treatment of biliary and pancreatic endoscopy (hereinafter referred to as "the platform")

The frequency distribution of registered doctors landing on the platform is as follows: 105 (14.9%) once a week or less, 286 (40.6%) twice to three times a week, 228 (32.43%) four to five times a week, 63 (8.9%) six to seven times a week and 21 (2.9%) more than seven times a week; The length of time for registered doctors to join the platform: 136 (19.3%) less than 6 months, 328 (46.6%) 6–12 months, 169 (24.0%) 1–2 years and 70 (9.9%) more than 2 years; Distribution of main activities of registered doctors on the platform (multiple choices): 38.8% (273 / 703) search for information or services needed on the platform, 47.5% (334 / 703) simply browse posts or dive, 52.0% (366 / 703) find new posts and provide help, 45.3% (319 / 703) post and seek information or services, 33.2% (234 / 703) interact with friends and exchange information, 17.0% (120 / 703) of them interacted with teaching experts and solved problems online; the time distribution of registered doctors participating in platform activities each time: 77 (10.9%) less than half an hour, 380 (54.0%) from half an hour to one hour, 214 (30.4%) from one to two hours and 32 (4.5%) more than two hours; After the live broadcast of the course on the platform, watch the playback of the course: 341 people (48.5%) often watch it, 276 people (39.2%) occasionally watch it, and 86 people (12.2%) don't need to watch the playback; After the registered doctors joined the platform, the impact on their own endoscopic operation level: 469 (66.7%) had a significant effect, 209 (29.7%) had a general effect, and 25 (3.5%) had no effect; After joining the platform, the specific improvement of endoscopic operation (multiple choices): skillfully entering the endoscope into the designated position accounted for 51.4% (362 / 703), intubation of bile duct or pancreatic duct accounted for 50.9% (358 / 703), removal of bile duct stones and pancreatic duct stones accounted for 53.0% (373 / 703), treatment of complications after endoscopic operation accounted for 44.8% (315 / 703), and diagnosis under endoscopic ultrasound accounted for 22.3% (157 / 703), others accounted for 1.7% (12 / 703); The impact on the diagnostic level of biliary and pancreatic related diseases: the feeling was significantly improved in 354 (50.3%), not significantly improved in 162 (23.0%), not improved in 130 (18.4%), decreased in 49 (6.9%) and unclear in 8 (1.1%).

3.2 Since joining this platform, comparison of the influence of the endoscopic operation level of registered doctors on this platform under different conditions

Since joining this platform, there is no statistically significant difference in the impact of different gender, age, educational background, hospital grade and professional title of registered doctors on their own endoscopy level ($P > 0.05$). There is statistically significant difference in the impact of the specialty of registered doctors engaged in clinical work on their own endoscopy level ($P < 0.05$) (see Table 1). After further analysis, it is concluded that the effect of improving the endoscopic level of registered doctors in the endoscopic center is the most significant. The reason is that the platform is mainly a platform for professional communication of digestive endoscopy dominated by ERCP and ultrasonic endoscopy. Compared with the departments of gastroenterology and general surgery, the endoscopic center is more engaged in such operations.

Table 1 After joining the platform, the effect of different situations of registered physicians on their own endoscopic operation level was compared(n,%)

Project	Influence of registered doctors' endoscopic operation level after joining the platform			χ^2	<i>P</i>
	Significant effect	Average effect	No effect		
Gender				5.387	0.068
Male	337(64.6)	167(32.0)	17(3.2)		
Female	132(72.5)	42(23.0)	8(4.3)		
Age				11.872	0.131
Under 19	22(56.4)	15(38.4)	2(5.1)		
20 ~ 29 years old	229(63.7)	116(32.3)	14(3.8)		
30 ~ 39 years old	189(71.0)	71(26.6)	6(2.2)		
40 ~ 49 years old	26(72.2)	7(19.4)	3(8.3)		
Over 50	3(100)	0(0)	0(0)		
Education				1.163	0.884
College	110(65.0)	54(1.9)	5(2.9)		
Undergraduate college	298(67.8)	125(28.4)	16(3.6)		
Master degree or above	61(64.2)	30(31.5)	4(4.2)		
Hospital grade				14.639	0.055
Class III class A	127(72.5)	43(24.5)	5(2.8)		
Class III B	147(63.3)	80(3.4)	5(2.1)		
Class II class A	154(68.1)	62(27.4)	10(4.4)		
Second class B	32(62.7)	17(33.3)	2(3.9)		
Other	9(47.3)	7(36.8)	3(15.7)		
Specialty of clinical work				20.224	0.007
GI Medicine	115(78.7)	30(20.5)	1(0.6)		
General surgery	183(66.3)	84(30.4)	9(3.2)		
Endoscopic Center	128(60.0)	75(35.2)	10(4.6)		
Nursing specialty	33(64.7)	15(29.4)	3(5.8)		
Other	10(58.8)	5(29.4)	2(11.7)		

Project	Influence of registered doctors' endoscopic operation level after joining the platform			χ^2	<i>P</i>
	Significant effect	Average effect	No effect		
Title				16.472	0.07
Medical students	80(74.0)	25(23.1)	3(2.7)		
Resident	125(69.4)	48(26.6)	7(3.8)		
Attending doctor	155(68.5)	67(29.6)	4(1.7)		
Deputy chief physician	66(55.9)	46(38.9)	6(5.0)		
Chief physician	26(61.9)	14(33.3)	2(4.7)		
Other titles / identities not listed	17(58.6)	9(31.0)	3(10.3)		

3.3 Since joining this platform, the influence of registered doctors on the diagnosis level of biliary and pancreatic related diseases in different situations is compared

Since joining this platform, there was no significant difference in the influence of different ages of registered doctors on the diagnosis level of biliary and pancreatic related diseases ($P > 0.05$). There was significant difference in the influence of different gender, educational background, hospital grade, specialty and professional title engaged in clinical work on the diagnosis level of biliary and pancreatic related diseases ($P < 0.05$) (see Table 2). Further statistical analysis shows that male clinicians working in class III class A hospitals and engaged in general surgery have significantly improved their diagnostic level of biliary and pancreatic related diseases, which is closely related to the fact that most clinical doctors engaged in general surgery are men. In addition, clinical medical students, including professional postgraduates and social training personnel, have been struggling in their jobs for a certain time, but there is still a big gap in disease diagnosis, treatment and clinical experience compared with other senior doctors. After the "charging" of continuous medical education, the learning effect has been significantly improved.

Table 2

Comparison of the influence of different registered doctors on the diagnosis of biliary and pancreatic diseases after joining the platform (n,%)

Project	Influence of registered doctors on the diagnosis of biliary and pancreatic diseases after joining the platform					χ^2	<i>P</i>
	Significantly improve	The improvement is not obvious	Not improved	Lower than before	Not too clear		
Gender						22.195	0.000
Male	238(45.6)	131(25.1)	109(20.9)	39(7.4)	4(0.7)		
Female	116(63.7)	31(17.0)	21(11.5)	10(5.4)	4(2.1)		
Age						9.821	0.904
Under 19	16(41.0)	10(25.6)	11(28.2)	2(5.1)	0(0.0)		
20 ~ 29 years old	177(49.3)	82(22.8)	69(19.2)	26(7.2)	5(1.3)		
30 ~ 39 years old	137(51.5)	63(23.6)	45(16.9)	19(7.1)	2(0.7)		
40 ~ 49 years old	21(58.3)	7(19.4)	5(13.8)	2(5.5)	1(2.7)		
Over 50	3(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)		
Education						17.341	0.027
College	92(54.4)	33(19.5)	29(17.1)	9(5.3)	6(3.5)		
Undergraduate college	211(48.0)	105(23.9)	88(20.0)	34(7.7)	1(0.2)		
Master degree or above	51(53.6)	24(25.2)	13(13.6)	6(6.3)	1(1.0)		
Hospital grade						35.302	0.002
Class III class A	112(64.0)	36(20.5)	18(10.2)	7(4.0)	2(1.1)		
Class III B	102(43.9)	61(26.2)	55(23.7)	13(5.6)	1(0.4)		
Class II class A	107(47.3)	49(21.6)	44(19.4)	23(10.1)	3(1.3)		
Second class B	23(45.0)	11(21.5)	12(23.5)	4(7.8)	1(1.9)		
Other	10(52.6)	5(26.3)	1(5.2)	2(10.5)	1(5.2)		

Project	Influence of registered doctors on the diagnosis of biliary and pancreatic diseases after joining the platform					χ^2	<i>P</i>
	Significantly improve	The improvement is not obvious	Not improved	Lower than before	Not too clear		
Specialty of clinical work						35.3	0.002
GI Medicine	98(67.1)	24(16.4)	17(11.6)	7(4.7)	0(0.0)		
General surgery	123(44.5)	77(27.8)	56(20.2)	18(6.5)	2(0.7)		
Endoscopic Center	99(46.4)	47(22.0)	45(21.1)	19(8.9)	3(1.4)		
Nursing specialty	27(52.9)	10(19.6)	10(19.6)	2(3.9)	2(3.9)		
Other	7(41.1)	4(23.5)	2(11.7)	3(17.6)	1(5.8)		
Title						41.321	0.001
Medical students	66(61.1)	22(20.3)	14(12.9)	6(5.5)	0(0.0)		
Resident	97(53.8)	38(21.1)	37(20.5)	7(3.8)	1(0.5)		
Attending doctor	106(46.9)	56(24.7)	48(21.2)	14(6.1)	2(0.8)		
Deputy chief physician	47(39.8)	32(27.1)	23(19.4)	16(13.5)	0(0.0)		
Chief physician	24(57.1)	8(19.0)	6(14.2)	3(7.1)	1(2.3)		
Other titles / identities not listed	14(48.2)	6(20.6)	2(6.8)	3(10.3)	4(13.7)		

3.4 Comparison of the impact of different registered doctors' learning on their endoscopic operation level after joining this platform

Since joining the platform, there was no significant difference in the impact of the frequency of registered doctors logging on the platform on their own endoscopic operation level ($P > 0.05$). However, there was significant difference in the impact of the length of time registered doctors joined the platform, the time they participated in the platform activities each time, and whether they watched the playback of the course after the live broadcast of the platform on their own endoscopic operation level ($P < 0.05$), (see Table 3).

Table 3 After joining the platform, the comparison of the influence of different registered doctors' learning situation on their own endoscopic operation level (n,%)

Project	After joining this platform, registered doctors' own endoscopic operation level will be affected			χ^2	P
	Significant effect	Average effect	No effect		
Landing platform frequency				6.448	0.570
Once a week or less	71(67.6)	31(29.5)	3(2.8)		
2 ~ 3 times a week	196(68.5)	80(27.9)	10(3.4)		
4 ~ 5 times a week	151(66.2)	70(30.7)	7(3.0)		
6 ~ 7 times a week	35(55.5)	24(38.0)	4(6.3)		
More than 7 times	16(76.1)	4(19.0)	1(4.7)		
Length of time to join this platform				19.855	0.003
Less than 6 months	97(71.3)	35(25.7)	4(2.9)		
6 ~ 12 months	224(68.2)	94(28.6)	10(3.0)		
1 ~ 2 years	92(56.8)	69(40.8)	8(4.7)		
More than 2 years	56(80.0)	11(15.7)	3(4.2)		
Time for each platform activity				16.101	0.013
Less than half an hour	59(76.6)	13(16.8)	5(6.4)		
Half an hour to an hour	259(68.1)	111(29.2)	10(2.6)		
One to two hours	127(59.3)	79(36.9)	8(3.7)		
More than two hours	24(75.0)	6(18.7)	2(6.2)		
Watch the playback of the course				123.368	0
Often watch	296(86.8)	39(11.4)	6(1.7)		
Occasionally	134(48.5)	130(47.1)	12(4.3)		
Don't need to watch playback	39(45.3)	40(46.5)	7(8.1)		

3.5 Comparison of the impact of different registered doctors' learning on the diagnosis level of biliary and pancreatic related diseases after joining this platform

Since joining the platform, the frequency of registered doctors logging on the platform, the duration of joining the platform, the time of participating in platform activities each time, and whether to watch the

playback of the course after the live broadcast of the platform have a statistically significant difference on the diagnostic level of biliary and pancreatic related diseases ($P < 0.05$) (see Table 4).

Table 4 After joining the platform, the comparison of the influence of different registered doctors' learning on the diagnosis of biliary and pancreatic diseases (n,%)

Project	Influence of registered doctors on the diagnosis of biliary and pancreatic diseases after joining the platform					χ^2	P
	Significantly improve	The improvement is not obvious	Not improved	Lower than before	Not too clear		
Landing platform frequency						25.678	0.038
Once a week or less	66(62.8)	17(16.1)	13(12.3)	7(6.6)	2(1.9)		
2 ~ 3 times a week	148(51.7)	64(22.3)	50(17.4)	20(6.9)	4(1.3)		
4 ~ 5 times a week	101(44.2)	63(27.6)	50(21.9)	14(6.1)	0(0.0)		
6 ~ 7 times a week	26(41.2)	16(25.3)	14(22.2)	6(9.5)	1(1.5)		
More than 7 times	13(61.9)	2(9.5)	3(14.2)	2(9.5)	1(4.7)		
Length of time to join this platform						53.191	0.000
Less than 6 months	75(55.1)	28(20.5)	22(16.1)	7(5.1)	4(2.9)		
6 ~ 12 months	161(49.0)	85(25.9)	59(17.9)	21(6.4)	2(0.6)		
1 ~ 2 years	62(36.6)	41(24.2)	47(27.8)	18(10.6)	1(0.5)		
More than 2 years	56(80.0)	8(11.4)	2(2.8)	3(4.2)	1(1.4)		
Time for each platform activity						25.133	0.011
Less than half an hour	44(57.1)	19(24.6)	7(9.0)	3(3.8)	4(5.1)		
Half an hour to an hour	192(50.5)	91(23.9)	74(19.4)	21(5.5)	2(0.5)		
One to two hours	100(46.7)	43(20.0)	47(21.9)	22(10.2)	2(0.9)		
More than two hours	18(56.2)	9(28.1)	2(6.2)	3(9.3)	0(0.0)		

Project	Influence of registered doctors on the diagnosis of biliary and pancreatic diseases after joining the platform					χ^2	P
	Significantly improve	The improvement is not obvious	Not improved	Lower than before	Not too clear		
Watch the playback of the course						199.519	0.000
Often watch	260(76.2)	33(9.6)	35(10.2)	13(3.8)	0(0.0)		
Occasionally	73(26.4)	100(36.2)	74(26.8)	27(9.7)	2(0.7)		
Don't need to watch playback	21(24.4)	29(33.7)	21(24.4)	9(10.4)	6(6.9)		

Statistical analysis on the learning situation of registered doctors landing on the platform: there was no significant difference in the impact of the frequency of registered doctors landing on the platform on their own endoscopic operation level ($P > 0.05$), but the length of time registered doctors joined the platform, the time of participating in platform activities each time and after the platform live broadcast course, the influence of watching the playback of the course on their own endoscopic operation level is statistically significant ($P < 0.05$). Further statistical analysis shows that whether the length of time registered doctors join the platform or each time they participate in platform activities does not mean that the longer the time, the better the impact on the registered doctors' own endoscopic operation level. In contrast, the registered doctors who have joined the platform for 6–12 months and the registered doctors who have participated in the platform activities for one to two hours each time benefit significantly; In addition, the frequency of registered doctors logging on the platform, the length of time they joined the platform, the time they participated in the platform activities each time, and whether they watched the playback of the course after the live broadcast of the platform had a statistically significant difference on the diagnostic level of biliary and pancreatic related diseases ($P < 0.05$). It is worth mentioning that the latter (the impact on the diagnostic level of biliary and pancreatic related diseases) was compared with the former (impact on self endoscopic operation level), there are differences in the frequency of registered doctors landing on the platform, and the students who log on to the platform 4–5 times a week for learning have significantly improved their level of disease diagnosis. The reason is that for theoretical knowledge, medical workers can review the platform many times to memorize and master the knowledge points. However, they want to thoroughly master the actual clinical operation skills, this alone is far from enough. Practice makes perfect through repeated practical practice, which is also the limitation of continuing medical education based on the Internet platform.

4.Evaluation of Registered Doctors of the Platform on the Platform of Hebei Alliance for Diagnosis and Treatment of Biliary and Pancreatic Endoscopy

59.3% (417 / 703) think that the platform has a large number of knowledge resources, wide coverage and high reliability. 69.8% (491 / 703) think that the platform has a strong and friendly academic atmosphere

and that everyone is willing to share knowledge in order to exchange knowledge, share experience and increase knowledge. 45.3% (319 / 703) think that the platform has reasonable design, humanization and perfect functions, It is believed that the platform relies on a strong medical team, which is very friendly and has a close relationship with users. 48.0% (338 / 703) of the team members trust it very much. The registered doctors themselves have a certain authority or reputation in the platform, and many people pay attention to it, accounting for 13.5% (95 / 703); 94.0% (661 / 703) of registered doctors were very willing to recommend this platform to others, and 5.9% (42 / 703) were unwilling to recommend this platform to others, it can be seen that the application effect of the platform on students' continuing medical education has been affirmed by the vast majority of registered doctors.

Discussion

In recent years, with the rapid development of Internet technology, the Internet platform of digestive endoscopy has undergone unprecedented changes. A large number of widely used Internet platforms have sprung up. The "Hebei Alliance for diagnosis and treatment of biliary and pancreatic endoscopy" based on the app platform of doctor circle is one of them. This platform is mainly a platform for professional exchange of biliary and pancreatic endoscopy such as biliary and pancreatic related diseases, ERCP and ultrasonic endoscopy. The basic purpose of this platform is to help clinicians of digestive endoscopy and other specialties freely carry out continuing education, continuously improve the skill level and academic level of clinical endoscopists in China, and encourage elites in the field and even beginners of endoscopy to interact and share experience, mutual supervision and common progress. In recent years, domestic studies[7] have confirmed that the orthopaedic professional Internet platform is conducive to improving the skill level and clinical level of orthopaedic clinicians in China. So far, there is no research on the use of digestive endoscopy professional Internet platform by endoscopists at home and abroad, and the impact of digestive endoscopy professional Internet platform on the continuing education of endoscopists. This study fills the gap in this research direction by means of questionnaire.

According to the results of this survey, registered doctors' evaluation of the platform: they think that the platform has a strong and friendly academic atmosphere and that everyone is willing to share knowledge in order to exchange knowledge, share experience and increase knowledge, accounting for 69.8% (491 / 703). They think that the platform has a large number of knowledge resources, wide coverage and high reliability, accounting for 59.3% (417 / 703); The top three items of registered doctors in the main activities of the platform are: finding new posts and providing help account for 52.0% (366 / 703), simply browsing posts or diving account for 47.5% (334 / 703), posting and seeking information or services account for 45.3% (319 / 703). It can be seen that the platform provides rich medical information resources for medical workers with heavy daily work, and a convenient and fast way to obtain medical knowledge and solve doubts, breaking through the constraints of time, place and funds. The establishment of its good communication platform also promotes real-time interactive learning, which is conducive to the sharing of medical education resources and the progress of personal medical level. At present, the global form of COVID-19 is severe, and the academic field of science and technology has been greatly affected. Various academic conferences at home and abroad were cancelled. With the help of the Internet platform, the

learning mode has become the primary choice for the majority of medical workers. Previous studies have confirmed that the surgical Internet platform is helpful to improve the surgical training of surgeons [8, 9], the cutting-edge medical information, diagnosis and treatment experience sharing, conference video of Digestive Endoscopy Society, ERCP, EUS operation video and so on covered by the platform are conducive to improving the skills and academic and other comprehensive quality level of clinical endoscopists and meeting the needs of individual development. However, it should be pointed out that the platform rarely involves humanities and social science knowledge. It is hoped that the person in charge of the platform can add relevant knowledge to meet the requirements of medical talent training combining social discipline quality and humanistic quality.

Limitations of this study: at present, the number of people successfully registered on the Internet platform of Hebei Alliance for biliary and pancreatic endoscopy diagnosis and treatment is 3938. Due to the short duration of the questionnaire (30 days from the beginning to the end), only 703 completed questionnaires were received, and the data is relatively small. In addition, this study uses the method of questionnaire survey for data statistics. The results are obviously affected by the subjective factors of the respondents, lack of objective evaluation criteria, and the results may have some bias, which is the place that needs to be improved in the research design in the future.

Conclusions

The new continuing medical education model based on the Internet platform breaks through the constraints of the traditional model, enables medical personnel to obtain cutting-edge medical science and technology information without restrictions on time, place and funds, meets the individualized needs of each medical worker to improve their comprehensive level, and achieves the purpose of continuing medical education. At present, the outbreak of global COVID-19 makes this learning mode more and more popular among medical workers. Relevant departments should pay attention to the development and utilization of the Internet platform, improve the arrangement for the content and form of continuing medical education courses, establish and improve the supervision and control system and feedback mechanism, so as to make the Internet platform better serve the majority of medical workers and effectively improve the comprehensive quality level of clinicians.

Abbreviations

CME: Continuing Medical Education;

ERCP: Endoscopic Retrograde Cholangiopancreatography;

EUS : Endoscopic Ultrasonography;

ESD : Endoscopic Submucosal Dissection;

POEM : Peroral Endoscopic Myotomy.

Declarations

The authors declare that all methods were performed in accordance with the relevant guidelines and regulations.

Ethics approval and consent to participate

The study has approval by a Research Ethics Committee of the second hospital of Hebei Medical University.(Approval Letter No.:2022-P003)

All participants have been informed by electronic informed consent.

Consent for publication

The authors declare that they have obtained the informed consent from all subjects and/or their legal guardian(s) for publication of identifying information/images in an online open-access publication.

Availability of data and materials

All data generated or analysed during this study are included in this

published article.The data used and\or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

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Authors' contributions

Guofu Li: data analysis & collection, manuscript writing. Tingting Yu: revision of the article for important intellectual content. Lichao Zhang, Haiming Du and Wei Zhang: data collection. Senlin Hou: conception and design; final approval of the article. All authors have read and approved the final manuscript.

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Figures

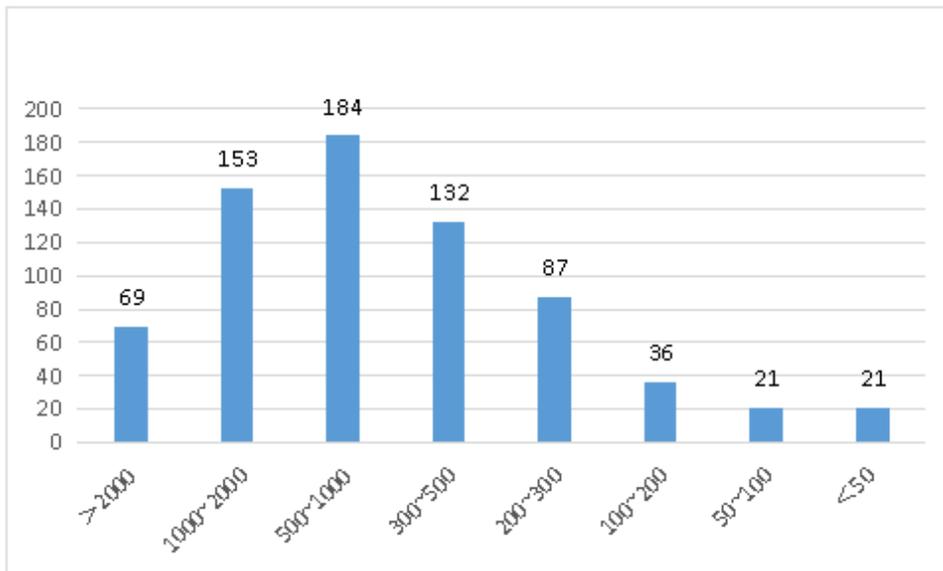


Figure 1

Statistics of ERCP cases cumulative completed by registered physicians.

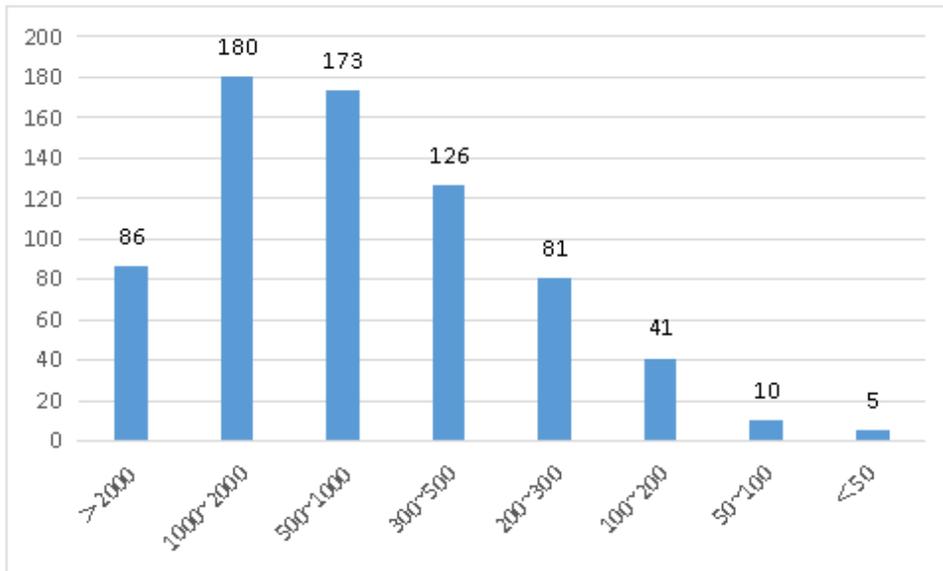


Figure 2

Statistics of ERCP cases cumulative completed by the hospitals of registered physicians.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SummaryofquestionnaireresultInEnglish.xlsx](#)